

WHAT IS CLAIMED IS:

1 .        An SPM cantilever comprising a support portion, a lever portion extended from the support portion and a probe portion formed at a free end of the lever portion, wherein: said probe portion has a generally plate-like form; the probe portion has an additionally sharpened terminal end portion; the terminal end portion has its length greater than the plate thickness thereof and is reduced in thickness toward a tip of the terminal end portion; and the tip is located inwardly of the planes extended from the front and back sides of a base portion of the plate-like probe portion.

2 .        The SPM cantilever according to claim 1, wherein said probe portion is generally triangular and two sides containing said terminal end portion are inwardly bent.

3 .        An SPM cantilever comprising a support portion, a lever portion extended from the support portion and a probe portion formed at a free end of the lever portion, wherein said probe portion is generally pyramidal or conic and the pyramidal or conic probe portion has an additionally sharpened terminal end portion.

4 . The SPM cantilever according to claim 3, wherein said probe portion is generally in the form of a triangular pyramid.

5 . The SPM cantilever according to claim 3, wherein said probe portion is generally in the form of a circular cone.

6 . The SPM cantilever according to any one of claims 1 to 5, wherein said probe portion is formed of silicon nitride.

7 . A fabricating method of SPM cantilever having a support portion, a lever portion extended from the support portion, and a probe portion formed at a free end of the lever portion, said method including the steps of:

depositing a silicon nitride film to become said probe portion and lever portion on a silicon substrate derived from silicon wafer;

patterning the silicon nitride film deposited on the silicon substrate into a configuration having an acute angle portion for forming said probe portion;

forming a protecting film with exposing said acute angle portion of the patterned silicon nitride film;

effecting a low-temperature thermal oxidation of the

exposed acute angle portion of the silicon nitride film;  
and

forming a sharpened probe portion by removing by means of fluoric acid the oxidized portion on the surface of the acute angle portion of the silicon nitride film treated of the low-temperature thermal oxidation.

8 . A fabricating method of SPM cantilever having a support portion, a lever portion extended from the support portion, and a probe portion formed at a free end of the lever portion, said method including the steps of:

forming a silicon projection for forming said probe portion on a silicon substrate derived from silicon wafer;

depositing a silicon nitride film to become said probe portion and lever portion on the silicon substrate having said silicon projection formed thereon;

effecting a low-temperature thermal oxidation of said silicon nitride film formed on said projection of the silicon substrate; and

forming a sharpened probe portion by removing by means of fluoric acid the oxidized portion on the surface of said silicon nitride film treated of the low-temperature thermal oxidation.

9 . The fabricating method of SPM cantilever according

to claim 7 or 8, wherein said silicon nitride film has a silicon content in terms of an elemental ratio between silicon and nitrogen greater than 3:4.

10. The fabricating method of SPM cantilever according to claim 7 or 8, wherein said silicon nitride film is formed by chemical vapor deposition.

11. The fabricating method of SPM cantilever according to claim 7 or 8, wherein said low-temperature thermal oxidation is effected at oxidizing temperatures above 900°C and below 1050°C.

12. The fabricating method of SPM cantilever according to claim 7 or 8, wherein said low-temperature thermal oxidation on the silicon nitride film is effected so that an oxide film having a film thickness of 50 nm or more be formed on (100) silicon lattice plane of said silicon substrate adjacent thereto.

13. An SPM cantilever fabricated by a fabricating method of cantilever having a support portion, a lever portion extended from the support portion, and a probe portion formed at a free end of the lever portion, said method including the steps of: depositing a silicon nitride film

to become the probe portion and the lever portion on a silicon substrate derived from silicon wafer; patterning the silicon nitride film deposited on the silicon substrate into a configuration having an acute angle portion for forming said probe portion; forming a protecting film with exposing said acute angle portion of the patterned silicon nitride film; effecting a low-temperature thermal oxidation of the exposed acute angle portion of the silicon nitride film; and forming a sharpened probe portion by removing by means of fluoric acid the oxidized portion on the surface of the acute angle portion of the silicon nitride film treated of the low-temperature thermal oxidation.

14. The SPM cantilever according to claim 13, wherein said probe portion is generally triangular and two sides containing a terminal end portion thereof are inwardly bent.

15. An SPM cantilever fabricated by a fabricating method of cantilever having a support portion, a lever portion extended from the support portion, and a probe portion formed at a free end of the lever portion, said method including the steps of: forming a silicon projection for forming said probe portion on a silicon substrate derived from silicon wafer; depositing a silicon nitride film to

become said probe portion and lever portion on the silicon substrate having said silicon projection formed thereon; effecting a low-temperature thermal oxidation of said silicon nitride film formed on the projection of said silicon substrate; and forming a sharpened probe portion by removing by means of fluoric acid the oxidized portion on the surface of said silicon nitride film treated of the low-temperature thermal oxidation.

16. The SPM cantilever according to claim 15, wherein said probe portion is generally pyramidal or conic.

17. The SPM cantilever according to claim 16, wherein said probe portion is generally in the form of a triangular pyramid.

18. The SPM cantilever according to claim 16, wherein said probe portion is generally in the form of a circular cone.

19. The SPM cantilever according to any one of claims 13 to 18, wherein said silicon nitride film has a silicon content in terms of an elemental ratio between silicon and nitrogen greater than 3:4.

20. The SPM cantilever according to any one of claims 13 to 18, wherein said silicon nitride film is formed by chemical vapor deposition.

21. The SPM cantilever according to any one of claims 13 to 18, wherein said low-temperature thermal oxidation is effected at oxidizing temperatures above 900°C and below 1050°C.

22. The SPM cantilever according to any one of claims 13 to 18, wherein the low-temperature thermal oxidation on said silicon nitride film is effected so that an oxide film having a film thickness of 50 nm or more be formed on (100) silicon lattice plane of said silicon substrate adjacent thereto.